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Vietnam's IT-2000 Program: The Challenges Ahead

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Abstract

Information Technology (IT) has much to offer, ranging from improved efficiency in business operations and service delivery to growth in local economies and high-technology based industries. In order to be more integrated into the world community, especially in the South East Asian region, the Government of Vietnam issued Resolution 49/CP in August, 1993. This resolution, which describes the status of IT in Vietnam, provides concepts and objectives for its development up to the year 2000.

A national IT program, coordinated by the National Program on Information Technology Steering Committee (NPITSC), has since been developed to implement the goals set out in resolution 49/CP. In this paper, we present an overview of the program, known as IT-2000; we recognize the challenges associated with its implementation; and we identify what we believe to be the main priorities. Two of these priorities are to be addressed immediately: training and data communications networks. In order to do so, we recommend a training model for enhancing human potential in Vietnam, and a pilot project for developing data communication networks.

1 Introduction

Vigorous economic rejuvenation in Vietnam is creating a favorable environment for the development of Information Technology (IT). In recognition of the importance of IT to the nation's social and economic development, the Government of Vietnam is taking steps to encourage its growth.

In August 1993, the Government issued Resolution 49/CP (SRV, 1993). This document reviews the status of IT in Vietnam, and formulates goals, objectives and guiding concepts for its development up to the year 2000.

In June 1994, the Government decided to establish the National Program on Information Technology Steering Committee (NPITSC). One of the Steering Committee's first tasks was to develop a program to implement the goals defined in Resolution 49/CP. As a result of consultation with various Ministries, IT experts in Vietnam, and collaborators from abroad, NPITSC formulated a national program, known as the IT-2000 Program (Dieu, 1994) (SRV, 1995).

The purpose of this paper is two-fold: first, to present an overview of the IT-2000 Program, and second, to propose an implementation strategy designed to address the Program's most important priorities. Section 2 of the paper presents an overview of the IT-2000 Program, Section 3 identifies the implementation challenges, Section 4 sets out the priorities, and Section 5 draws conclusions and makes recommendations.

2 Overview of Vietnam's IT-2000 Program

The overall goal of the IT-2000 Program, as defined in Resolution 49/CP, is to build an Information Technology infrastructure within Vietnam. This infrastructure will serve the dual purpose of meeting the basic information needs of state management and socio-economic activities, and strengthening Vietnam's competitive position in a global, information-dependent economy. Briefly, the key to successful implementation of the IT-2000 Program is to address IT infrastructure in the four areas listed below, and to apply the benefits of this infrastructure to a broad range of sectors.

2.1 IT Infrastructure

The IT-2000 Program considers the following four areas to be of paramount importance: IT education and training, IT research and development (R&D), an IT industry, and data communication networks.

2.1.1 IT Education and Training

It has been suggested that Vietnam will require approximately 20000 skilled computer specialists by the year 2000—one half programmers, one quarter system analysts—to achieve the objectives of the IT-2000 Program. If such rapid growth is to be realized, steps must be taken to create and sustain a pool of highly skilled software specialists. The steps to be taken entail:

- developing basic and specialized training to produce programmers and system analysts;
- facilitating training and assistance from overseas;
- establishing IT centers of excellence;
- implementing early dissemination of IT in high schools; and
- encouraging the creation of IT vocational schools.

The success of the IT industry, therefore, depends on appropriate levels of investment in human resources development.

2.1.2 IT Research and Development

Since there is a pressing need for ubiquitous, usable information systems throughout Vietnam, the program's initial focus will be on IT applications, with particular emphasis on software development and computer networking. The principal R&D activities will explore and adapt state-of-the-art technologies to meet the most basic needs of state administration and socio-economic development. Once this becomes successful, attention will turn to more advanced research.

To ensure that existing R&D resources are used to best effect, the mandates and priorities of research institutions will be evaluated, and new mandates and priorities will be defined and assigned as necessary. Technology transfer and international collaboration will be negotiated to help research institutions build the requisite knowledge base. To do this, a number of enabling strategies has been identified, including:

- strengthening the existing Institute of Information Technology;
- strengthening existing Computer Science departments;
- encouraging the creation of IT R&D units within local universities and private companies; and
- developing an education and R&D network to be known as the Vietnam Academic Research Education Network (VARENet).

2.1.3 An IT Industry for Vietnam

As Vietnam begins to build a domestic IT industry, it will concentrate primarily on growing the software portion and improving service delivery to users. The hardware portion will be realized through joint ventures and technology transfer initiatives because of the large financial investment involved.

The main focus will be on customizing and integrating off-the-shelf software; in the short term, software products will be targeted locally for state administrative and socio-economic activities. Once experience has been gained on the domestic front, focus will gradually shift toward the export market. Key measures include:

- encouraging software development for state management and socio-economic applications,
- encouraging the creation of software development associations,
- developing an IT industry within a high technology park, and
- defining incentive policies for the IT industry.

2.1.4 Data Communication Networks

Certain key areas of Vietnam's social and economic structure will benefit greatly from ready access to data communications systems. Because of this, the national IT program will give priority to data communication networks that serve the needs of these areas: namely,

state management, finance and commerce, education and R&D.

It makes no sense for all these systems to exist in isolation from one another, or for them to use unique, proprietary technologies and interfaces, since an ability to interwork will provide added value. As a result, they should adopt the "open system" concept that requires compliance with norms aligned to global trends and international standards. This concept promotes compatibility of systems and products, and facilitates their expansion and development. Compliance with the trends in IT development elsewhere in the world, and the needs of IT application in Vietnam will guide the criteria used in developing systems.

2.2 IT Application

An IT infrastructure is of little value unless it is put to work. The IT-2000 Program promotes the application of IT to a number of sectors to meet their increasing demand for accurate, timely information. In production and trade, IT has the potential to increase productivity as well as quality and effectiveness. Computer-aided design (CAD), for example, and the automation of manufacturing processes will expedite the modernization of production. In the service sector, IT will increase efficiency in tourism, transport, air navigation, insurance and many other areas. In addition, IT has the potential to enrich the quality of life for many people through improvements to the health care industry, as well as in cultural and social activities. Furthermore, IT will play a useful part in surveying and investigative work associated with natural resource development and environmental protection.

Computerization projects addressing these areas include:

- a national database system and information system for public administration and state management,
- an information system for economic planning,
- modernization of the banking system, and
- a national statistics information system.

When these four areas have been fully addressed, and the benefits of IT have permeated society, Vietnam will be well placed to advance to the next stage of modernization and industrialization.

3 Challenges

Despite the clarity of the vision of the IT-2000 Program, there are a number of impediments to its realization. The lack of IT specialists at all levels is hindering the development of an IT industry in Vietnam, as are the limited IT infrastructure, the underdeveloped socio-economic environment, and the low level of private sector participation.

3.1 Skilled Professionals

Vietnam lacks specialists in all areas of IT expertise including system analysis, software development, IT training and research, and system engineering. Without technical specialists skilled in IT, an IT infrastructure cannot be implemented or operated effectively. Furthermore, without knowledge and experience in IT management, large technological projects cannot be streamlined and coordinated. Even with assistance from abroad, time, money and effort will still be wasted if IT projects are not managed properly. It is therefore of paramount importance that Vietnam start developing its human resource potential immediately. IT specialists with both technical and management skills will be required.

3.2 IT Infrastructure

Limited access to information has created an information shortfall in all walks of life. Government agencies need to communicate more effectively in order to streamline operations and reduce overlapping efforts. Financial and commercial institutions need better access to automatic data communications for financial transactions, payment services, business and trade to support Vietnam's burgeoning industry and commerce. Universities and research institutions need to keep up with current literature in order to enhance their knowledge base and maximize their R&D capabilities.

3.3 Socio-Economic Environment for IT Development

Vietnam's social and economic structures are in transition from being centrally controlled to market-driven, thereby creating a discontinuity that presents both an opportunity and a roadblock to the introduction of new technology. On the one hand, widespread application of IT has the potential to increase productivity, quality and efficiency in manufacturing and commercial activities, as well as to improve quality of life through health care and social services. On the other, this major enabler of economic and administrative reform may be impacted by the lack of a suitable environment for growth. Once IT is seen to be a useful tool for providing complete, accurate and timely information at the most basic level, the climate will be right for developing more sophisticated studies aimed at further reforms. The popularization of an "information culture" in Vietnamese society will encourage a suitable environment for the "information society."

3.4 Private Sector Participation in IT Development

Lessons learned from countries more experienced in IT indicate the importance of the private sector to any attempt at modernization. Yet in Vietnam, despite recognizing the potential for success that lies in software and IT services development, this sector has been slow to participate. Without encouragement in the form of tax incentives, investment assistance and

shared responsibility schemes, it is doubtful that individual businesses will take what is perceived as a great risk and stimulate more activity. A lack of policies and guidelines on foreign investment, technology transfer, intellectual property rights, and copyright protection is also an inhibiting factor.

4 Priorities for the IT-2000 Program

It is clear that Vietnam is about to embark on major development initiatives that will profoundly affect all aspects of the nation's economic and social structure, and that the challenges involved are significant. It is also clear that all the constituent parts of the IT-2000 Program cannot be addressed simultaneously, but that priorities must be set and choices made. With such a range of challenges and opportunities, selecting a starting point is a difficult task. In the remainder of the paper, we will discuss how to address two critical priorities: training and data communications.

The first—a training program—will, if properly implemented, produce graduates skilled in adapting quickly to current and emerging technologies. The second—a data communication network—will, by providing a backbone for other networks used in state management, socio-economic and academic activities, improve universal access to critical information.

4.1 Training

By investing in the creation of knowledge and expertise we are building a solid base for future growth. A powerful way to begin making that investment is to implement an effective training program in accordance with the following training model.

The training model has two components: management training, and technical training. The management training component is designed to equip project managers and program administrators with the skills to manage large-scale IT projects. The technical training component addresses two areas: the establishment of computer science programs capable of producing sufficient computer specialists to achieve the goals of IT-2000; and the training of trainers to put these programs into effect. The computer science training will meet both the short-term need for computer programmers and the longer term need for system specialists (Le, 1995). A two-year curriculum will address the former, a four year curriculum will address the latter. Management and trainer training will take place before the computer science training programs are deployed.

Management Training: IT management training, designed for project managers, will be delivered as a series of seminars and workshops. Technology subjects such as telecommunications, database technology, and software engineering will be covered, as will management subjects such as project management and total quality management. Experienced managers will be given the opportunity to upgrade their management skills in universities abroad, assisted jointly by the Government of Vietnam and the host countries.

(Overseas visits should be limited to two year's duration, and the work should be associated with a project in Vietnam.) Although many countries have expressed interest in joint projects, lack of coordination in Vietnam presents certain difficulties, and there is a pressing need for NPITSC to define a nationwide process for selecting candidates.

Technical Training: Technical training has two phases. The first focuses on training local IT trainers who will mainly be faculty members from universities and research institutions. The second phase focuses on producing computer programmers, computer analysts and system programmers through two-year and four-year computer science courses. Based partly on the Computing Curricula of the ACM/IEEE and programs offered in Canada, these courses assume no prior knowledge of computer science.

One-Year Trainer Training Program: These local trainers will form the mainstay of large-scale training of computer programmers, computer analysts and system programmers throughout Vietnam. They will be trained through a series of seminars and workshops that will last from one to several months, held in Vietnam to allow maximum participation. This phase will be completed during the first year of deployment.

Two-Year Computer Science Program: This program aims to produce computer programmers able to meet the immediate needs of the fast-growing software market. Reduced to the most-required elements, this intensive program stresses the practical aspects of computer programming rather than theoretical disciplines. The program consists of a core and three areas of specialization. The core includes computer science, mathematics, technical English, and a graduation project. It also introduces practical work-related concepts like project management. The areas of specialization are computer communications, database systems, and computer systems, all of which help build knowledge relevant to Vietnam's current IT needs. To demonstrate their ability to apply concepts learned, students are also required to complete a graduation project on a topic related to their field of specialization. On graduation, students receive a Certificate in Computer Programming and may credit up to 80 percent of their courses toward the first two years of the four-year Computer Science program. (Figure 1 summarizes the courses in the two-year program.)

Four-Year Computer Science Program: Students in the four-year program acquire practical programming skills, knowledge of basic computer hardware, software, and the ability to design and analyze programs both at detailed low level and overall system views. This program has three components: a core, an area of specialization, and a technical elective. The core is the same as for the two-year program, while the specialization areas provide additional knowledge and skills in information systems, computer communications, system engineering, software engineering, and scientific applications. Elective courses are related to computer science, mathematics, physics, and business administration. Specialization

areas and elective courses begin in third year on completion of the prescribed two-year core. Students in this program, like those in the two-year program, also complete a graduation project on a topic related to their field of specialization. On graduation, they receive a Bachelor of Computer Science degree and are qualified to become computer analysts and system programmers. (Figure 2 illustrates the courses in the four-year program.)

4.2 Data Communications Networks

By investing in data communication networks, we are building a firm foundation for streamlining existing operations and policies both in government and in the private sector. We are also creating opportunities for growth through the development of new businesses and new processes. And, as network accessibility increases, critical information can be shared more readily, common mistakes can be avoided, and useful experience can be gained.

In support of this, the Directorate General of Post and Telecommunications (DGPT) has been assigned the task of planning, managing and implementing the national data communication networks. These networks will use various modes of communication, namely:

- public switched telephone network (PSTN)
- public packet switched network (PPSN)
- integrated services digital network (ISDN)

The proposed data communications network will consist of a "backbone" with major nodes in key locations connected by high speed links. Government ministries and local provincial capitals will be able to connect to this backbone via packet-switched data service over leased lines. Users will quickly appreciate being able to use this service to distribute reports, requests for approval, meeting agenda, and news briefings by electronic means. They will also appreciate the convenience of being able to access large bodies of useful information at remote locations. For example, key information on banking, markets, prices and import-export performance can be smoothly delivered to interested parties in public and private sector alike.

As part of a unified program, a network of management information systems must be established for the various ministries, sectors, and localities. Priority will be given to modernizing the energy, transport and postal services, then to step-by-step modernization of the production sector to help improve product quality and service efficiency.

Yet, in spite of recent initiatives, data communications networking in Vietnam is still limited. Developments have occurred, but in the form of uncoordinated initiatives by individual institutions. As a result, the effectiveness of IT application is relatively low. Most networks are linked through point-to-point connections over telephone switching systems, and packet switching and ISDN technologies are still in their infancy. The proposed data communication network pilot project plays a key role in moving forward.

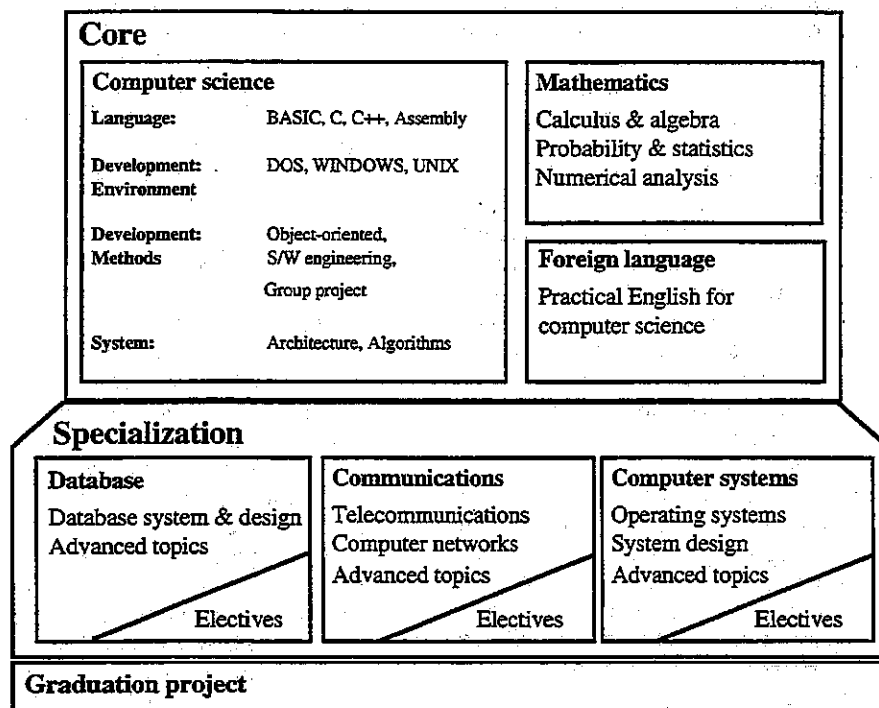


Figure 1 2-Year Program Overview

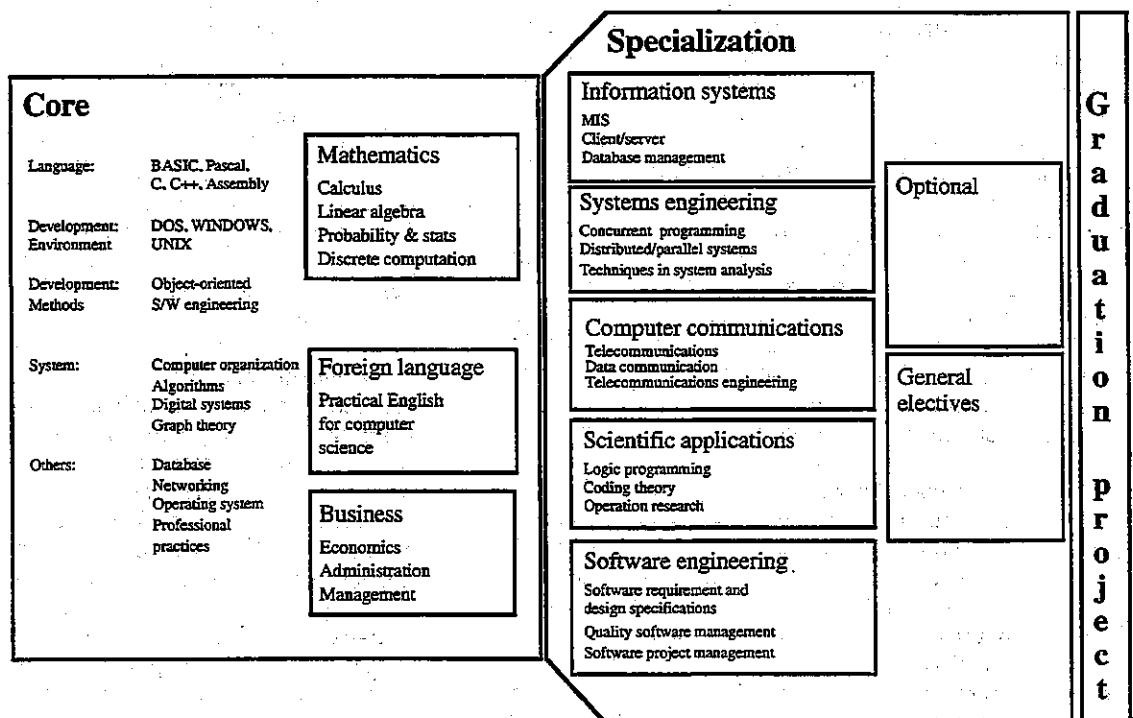


Figure 2 4-Year Program Overview